

United States Patent [19]
Lichstein et al.

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[54] **TAMPON APPLICATOR**

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[51] **Int. Cl.³** A61F 15/00

[52] **U.S. Cl.** 604/15

[58] **Field of Search** 604/11-18

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Primary Examiner—John D. Yasko

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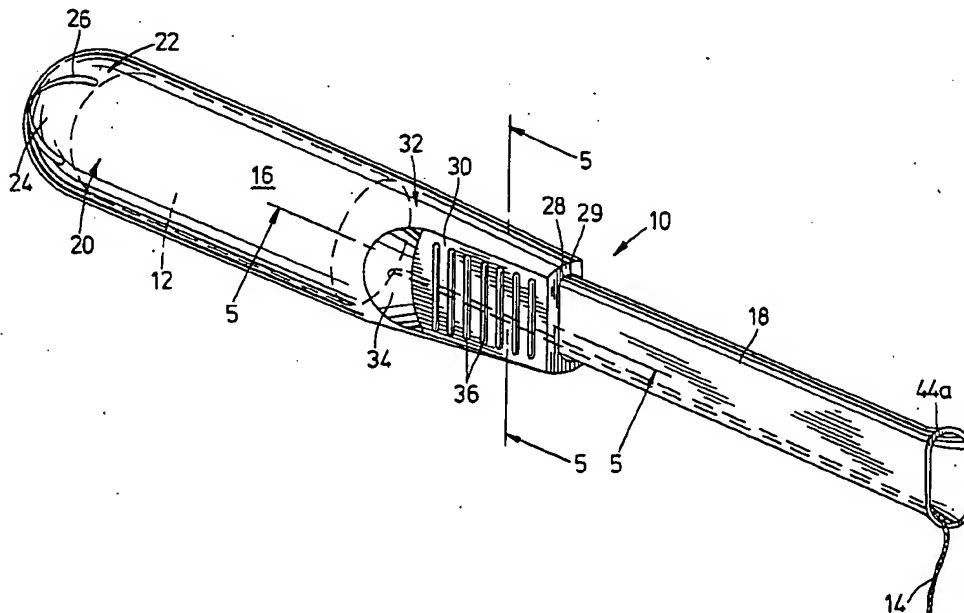
Attorney, Agent, or Firm—Stewart J. Fried

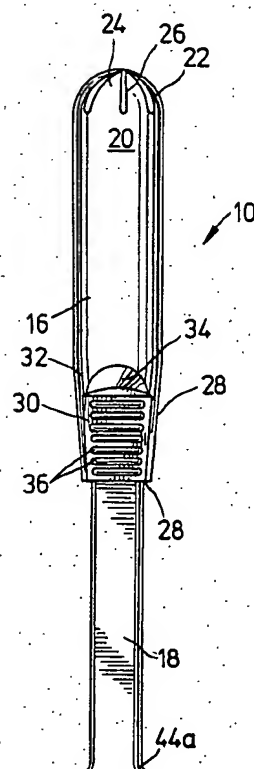
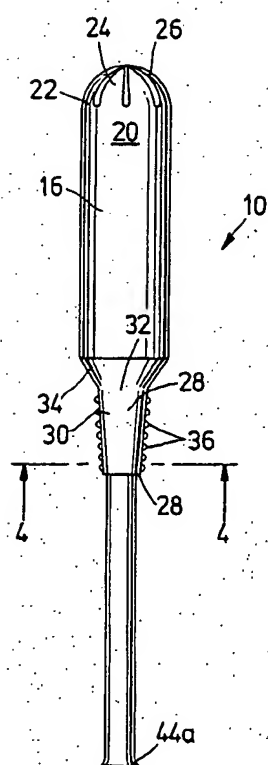
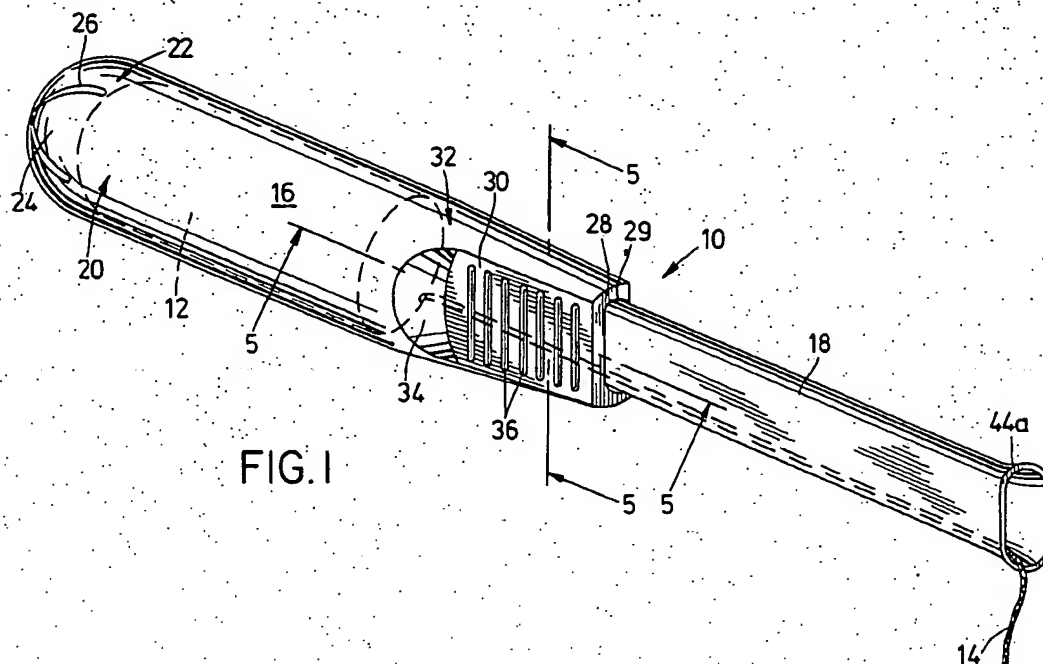
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ABSTRACT

A tampon applicator includes a tubular barrel adapted to house a tampon therein and accommodate a slidable, tubular plunger which is adapted to push the tampon within the barrel out of the forward end of the barrel into a vagina. The barrel includes a rear portion having two diametrically opposed, substantially flattened surfaces with gripping ribs thereon and an angled transitional shoulder which has a reduced diameter relative to the front portion of the barrel. The flattened surface and the angled shoulder form a thumb and finger hold which enables a user to securely and comfortably maneuver and position the applicator and tampon therein.

14 Claims, 6 Drawing Figures





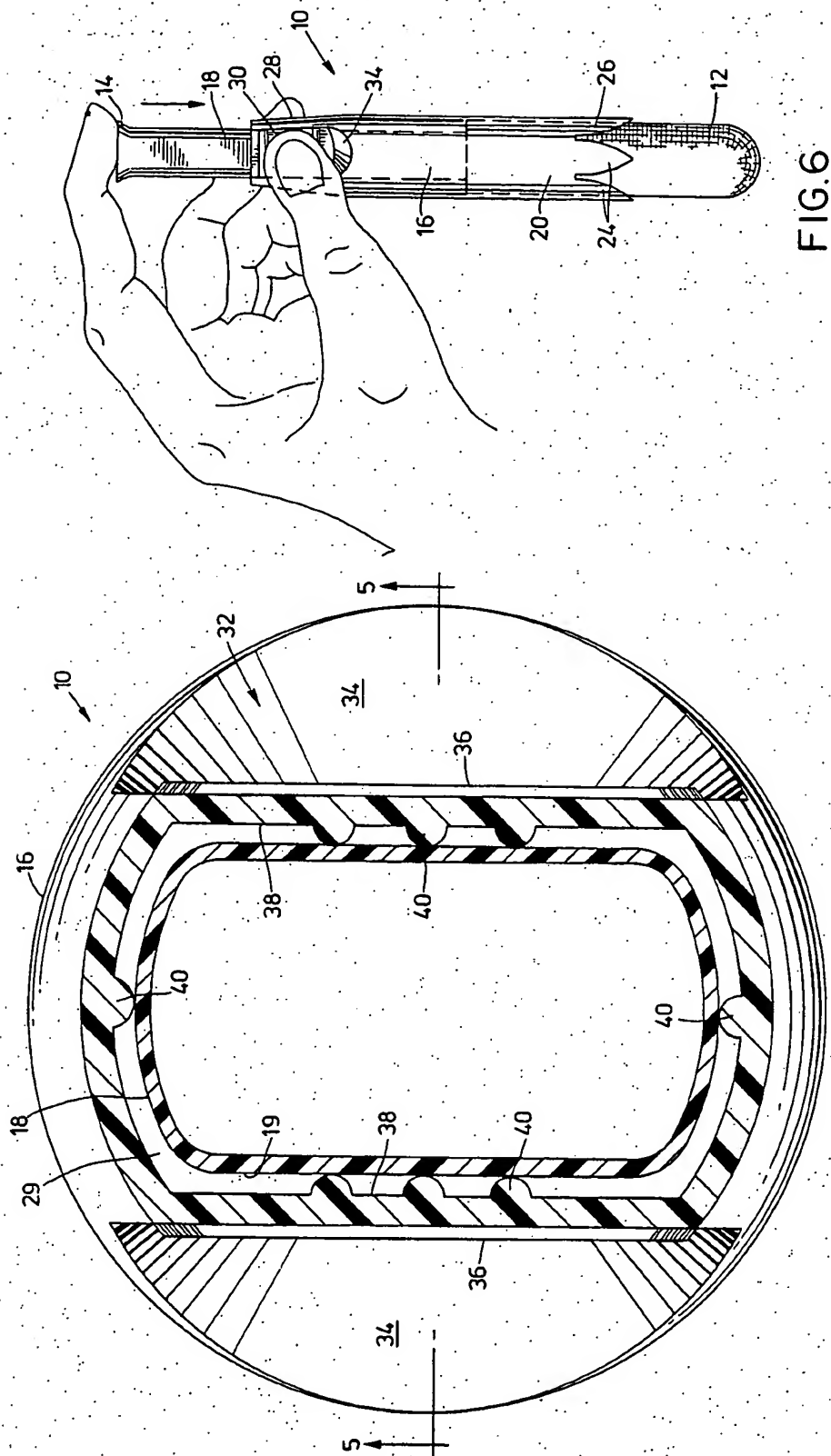


FIG. 6

FIG. 4

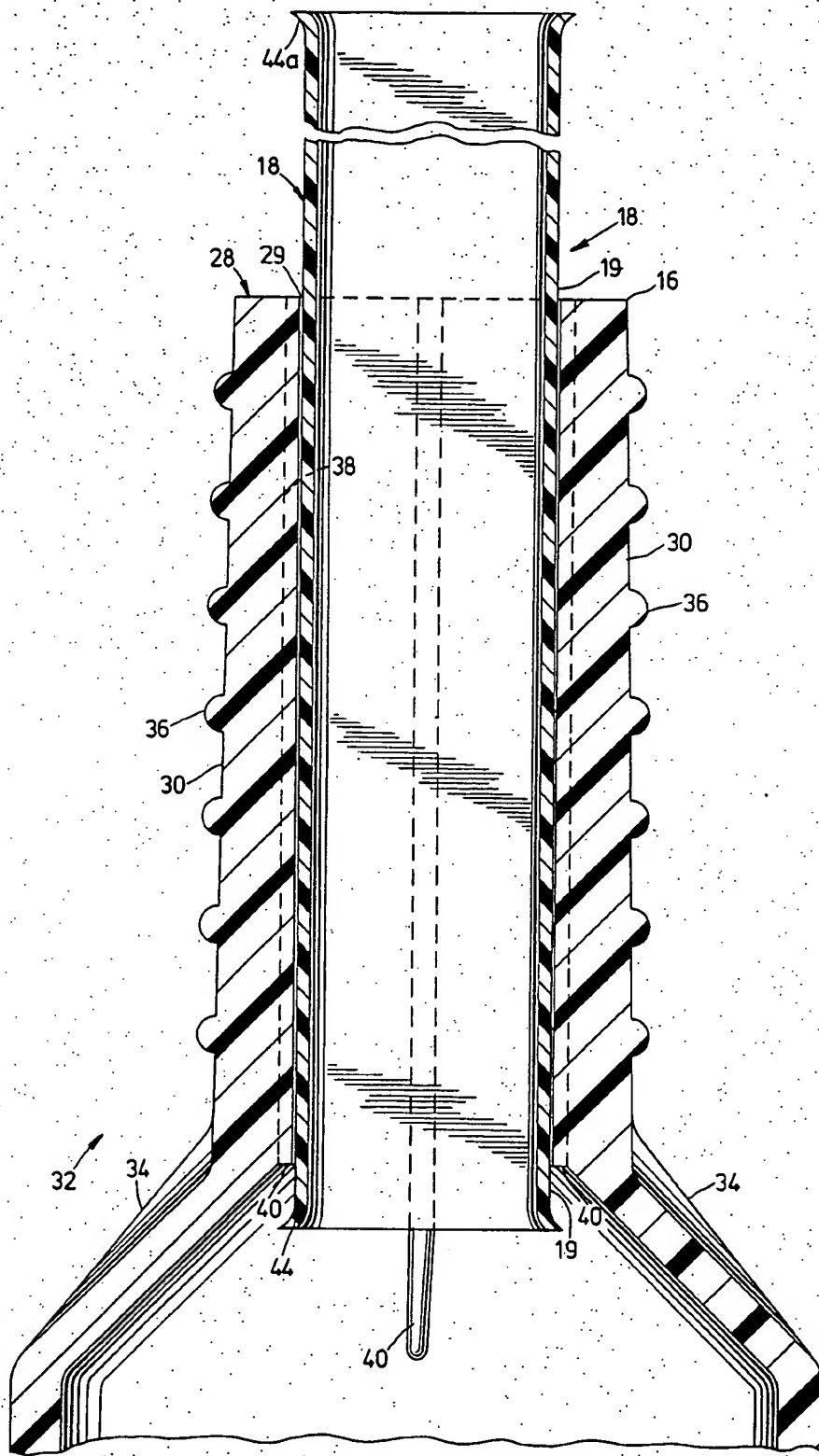


FIG. 5

TAMPON APPLICATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to catamenial devices for introducing catamenial tampons into the vaginal cavity and, more particularly, to a tampon applicator which is constructed in a manner to facilitate its use.

2. Description of the Related Art

Catamenial tampons have been replacing sanitary napkins in preference among large numbers of women due to its ease of use and lack of restriction. In particular, since a tampon is worn internally, its size and shape necessarily permit easy insertion or removal. Proper placement of the tampon within the vagina is extremely important in an effort to maximize leakage protection and comfort.

Three general methods of tampon insertion are typically used. The first involves the use of a tampon inserter or applicator consisting of a hollow cylinder having openings at both ends. A slidable, telescoping plunger is provided through one open end for ejecting the tampon through the opposite end after the cylinder has been placed within the vagina. The applicator and its plunger are removed from the vagina after the tampon has been ejected. The second method involves the use of a rigid inserter attached to the base of the tampon. The inserter is pulled away after it is used to insert the tampon. The third method involves direct placement of the tampon within the vagina with one's finger. The present invention relates to the first of these methods of insertion.

Tampon inserters or applicators are generally well known in the prior art. Typically, the applicators of the first method described above are comprised of telescopically slidable inner and outer tubes with a tampon being positioned along the inside of the outer tube and the inner tube being positioned beneath the base of the tampon. The tampon is expelled from the outer tube by moving the inner tube longitudinally within the outer tube in the direction of the tampon. The outer tube is typically formed from cardboard or plastic. The tampon itself is generally an elongated cylinder of compressed absorbent material and has a removal string which, upon placement within the applicator, extends out of the back of the outer tube through an opening therein.

Various configurations for the outer tube or container and inner tube or ejection means have been proposed to facilitate manufacture, handling and placement of the applicator as well as ejection of the tampon. These have included forming the applicator components from materials having different physical properties and varying the size and shape of the applicator components or tampons. The prior art developments most closely related to the present invention involve the various constructions with respect to the applicator including the container and ejection means.

For example, U.S. Pat. No. 3,124,134 to Gardner, issued Mar. 10, 1964, discloses a tampon applicator having a cylindrical sleeve which includes a reduced diameter portion 25 and transition portion 22. Although circumferential ribs 26 are provided to improve gripping of the applicator, the applicator is essentially cylindrical and therefore, upon tactile grasp thereof, the applicator permits and promotes at least rotational

movement or play, making maneuvering and positioning difficult.

U.S. Pat. No. 3,086,527 to Forrest, issued Apr. 23, 1963, also discloses an applicator that has a tubular barrel, but with an end portion having an arcuate depression which serves as a thumb and finger hold. As with Gardner, significant rotational play still exists due to the relatively cylindrical construction.

Accordingly, no tampon applicator to date has been simply designed to overcome the above-mentioned problem and, thus, provide security, comfort and control for a user.

SUMMARY OF THE INVENTION

In accordance with the invention, a tampon applicator includes a tubular barrel adapted to house and carry a tampon therein and a slidable, tubular plunger telescopically engageable with the barrel and operable to push the inner most end or base of a tampon within the barrel out of the forward end of the barrel into a vagina. The barrel includes a cylindrical front portion adapted to house the tampon and a rear portion adapted to engage the plunger and provide a transition between the rear plunger entry and support area of the barrel and the front portion. The rear portion has two diametrically opposed, substantially flattened surfaces which transcend from two diametrically opposed, angled shoulders. The flattened surfaces and angled shoulders provide a finger and thumb hold or grip which enables a user to comfortably hold the applicator with little or no involuntary rotation and to eject the tampon from the applicator and more accurately control the placement of the tampon.

In a preferred embodiment, the flattened surfaces of the rear portion have a plurality of spaced apart ribs to provide an improved tactile grip. Additionally, an arcuate depression may be provided on the substantially flattened surfaces of the rear portion of the barrel to further complement the finger configuration, aid in comfort of use and enhance the control of the applicator.

To further maximize tactile contact between the user's fingers and the applicator and to accommodate the flattened surfaces of the rear portion of the barrel, the axially engageable plunger preferably has a generally rectangular cross-section. The corners of the rectangular cross-section have some radius of curvature to reduce any untoward frictional contact with the inner surfaces of the rear portion and to enhance the aesthetic qualities of the device.

The applicator construction is further preferably provided with guide means to axially guide the plunger within the rearward portion of the barrel. The guide means preferably includes a plurality of ridges or protrusions on the inner tubular surface of the rear portion which are axially engageable with and along the length of the outer tubular surface of the plunger.

It has been shown as a result of extensive testing with the applicator in accordance with this invention that the finger and thumb hold or grip of the applicator has a significantly greater surface contact area (finger/applicator interface) in comparison to a conventional applicator having a relative cylindrical barrel. Further, it has been shown that the applicator in accordance with this invention significantly reduces the amount of involuntary rotation and, thereby, lack of control during insertion in comparison with use of a conventional applicator having a cylindrical barrel. Additionally, it has

been noted that the applicator in accordance with the invention provides a consumer perceptible, enhanced feeling of security, comfort and control which is theorized to be a result of a reduced level of muscle tension required to maneuver the applicator and deploy the tampon from the applicator.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of the tampon applicator in accordance with the invention;

FIG. 2 is a side elevational view of the applicator in FIG. 1;

FIG. 3 is a front elevational view of the applicator in FIG. 1;

FIG. 4 is an exploded, bottom sectional view of the applicator taken along lines 4—4 in FIG. 2;

FIG. 5 is a partial, exploded, side sectional view of the applicator taken along lines 5—5 of FIG. 4; and

FIG. 6 is a perspective view of the applicator in accordance with the invention with a tampon partially ejected therefrom.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As best seen in FIGS. 1 and 6, a tampon applicator or inserter 10 houses and carries a tampon 12 with a removal string 14 for ejection thereof into the vagina of a woman. The applicator 10 includes a slidable, tubular plunger 18 telescopically engageable with a barrel 16. The barrel 16 is tubular and adapted to house and carry the tampon 12 therein. The plunger 18 is adapted to push or eject the innermost end of the tampon 12 in the barrel 16 out of the forward or front portion 20 of the barrel 16 into the vagina of a user. The barrel 16 and plunger 18 are specially constructed to enhance security, comfort and control in maneuvering and positioning the applicator 10 and the tampon 12.

With reference to FIGS. 2 and 3, it can be seen that the barrel 16 includes a front cylindrical portion 20 and a rearward tubular portion 32. The front cylindrical portion 20 holds the tampon 12 therein and permits the tampon 12 to be ejected or passed therefrom through an hemispherical, dome-shaped tip 22. The tip 22 includes a plurality of petals 24 which are formed by a plurality of slits 26. The petals 24 are flexible enabling the tampon 12 to be ejected therethrough when the plunger 18 is pressed against the top of the tampon 12 within the barrel 16.

The rearward portion 32 has a decreasing or tapered diameter relative to the front portion 20 which serves as a transition between the front portion 20 and a rearward plunger entry and support area 28. The rearward portion 32 including two generally flattened surfaces 30 and two angled shoulder surfaces 34 also forms a novel finger and/or thumb hold or grip. As best seen in FIG. 6, a user preferably places her middle finger and thumb on the flattened surfaces 30 with the tip and side surfaces of the finger and thumb resting against the angled shoulders 34. The index finger of the same hand or of the other hand is rested against the bottom of the plunger 18 and is used to push the plunger 18 forward and thereby eject the tampon 12 after the applicator 10 has been inserted. Thus, the flattened surfaces 30 provide a grasp area while the angled shoulders 34 provide a push area for the finger and thumb. In total, the rear portion 32 provides a secure hold or grip which enables

the user to securely and comfortably maneuver and control the applicator barrel 16.

The angled shoulders 34 transcend from the cylindrical front portion 20 to the flattened surfaces 30 and, thus, have a reduced diameter relative to the front portion 20. The angled surface of the shoulders 34 can vary from almost 0° to almost 90° relative to the length of the barrel 16. Accordingly, the angled shoulder surfaces 34 of the rear portion 32 provide an area on which the middle finger and thumb of a user may push off or rest on during the grasping of the applicator 10 and insertion of the applicator 10 and tampon 12 into the vagina of a user.

To further enhance grasping of the barrel 16, the two generally flattened surfaces 30 are generally decreasingly tapered from the angled shoulders 34 to the plunger entry area 28. Additionally, a plurality of spaced apart ribs or treads 36 are provided on the surfaces 30. Although the ribs or treads 36 are configured in a straight and raised design, a stepped and/or curved design may be alternatively selected. The surfaces 30 may also be provided with a concavity or arcuate depression (not shown) configured to complement the curvature of a user's fingers. Thus, by providing the rear portion 32 of the barrel 16 with a generally flat, tapered configuration and with grasping ribs 36, the rear portion 32 of the barrel 16 serves as a grasping area for the middle finger and thumb.

The rear portion 32 is generally rectangular in cross-section to accommodate the flattened surfaces 30 thereof. Alternative cross-sectional shapes may be selected as long as such cross-sections accommodate the generally flattened surfaces 30 of the rear portion 32. Further, it should be understood that the cross-sectional areas of either end of the rear portion 32 do not necessarily need to be the same. For example, the examples shown in the figures have continued decreasing cross-sections from one end to the other. In addition, the cross-sections may reflect any concavities provided on the outer flattened surfaces 30 of the rear portion 32.

The rear portion 32 is also constructed to receive and axially engage the plunger 18 through an opening 29 therein. Accordingly, the general cross-sectional configuration of the rear portion 32 and the plunger entry area 28, in particular, are preferably similar or comparable to that of the plunger 18 to accommodate smooth axial engagement between the barrel 16 and the plunger 18. Further, as in the preferred embodiment, the corners of the rectangular cross section of the rear portion 32 have some radius of curvature which reduces any untoward frictional contact of the plunger 18 with the outer surfaces of the rear portion 28 and to enhance the aesthetic appearance of the applicator 10.

To further assure smooth axial engagement of the plunger 18 through and into the rear portion 32 of the barrel 16, an inner surface 38 of the rear portion 32 is provided with ridges or protrusions 40 which are adapted to engage exterior surfaces 19 of the plunger 18. As best seen in FIG. 5, these ridges 40 run the length of the interior of the rear portion 32 of the barrel 16. Accordingly, the ridges 40 provide a means for guiding the plunger 18 axially within the rearward portion 32 of the barrel 16.

The plunger 18 may additionally include means for limiting the movement of the plunger 18 through the rearward portion 32 of the barrel 16. One manner of limiting the movement of the plunger 18 is by providing at least one curled lip 44 integral with the inner end of

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the plunger 18 and engageable with the angled shoulders 34 and preferably a second curled lip 44a integral with the outer end of the plunger 18 and engageable with the plunger entry area 28 of the barrel 16. The second curled lip 44a additionally provides a comfortable surface for resting the index finger in pushing the plunger 18 forward to eject the tampon 12. The outer end of the plunger 18 may have other collar-like members or configurations such as an oval, circular cross-section or an arcuate finger rest which function in like manner as the curled lip 44a.

As best seen in FIG. 6, tampon insertion takes place with the aid of the applicator 10 in accordance with the invention by pushing the plunger 18 through the barrel 16 in contact with the tampon 12 to deploy the tampon 12 from the barrel 16 into a user's vagina. This deployment is performed almost entirely with tactile sense and under a wide range of diverse conditions and personal technique. However, as stated above, a typical user uses a minimum of three fingers to deploy the tampon and, in particular, usually uses the thumb and middle finger to grasp and manipulate the barrel 16 and the index finger to push the plunger 18 through the barrel 16. During the pushing of the plunger 18 into the barrel 16 and insertion and deployment of the tampon 12 from the applicator 10 into the vagina, increased grip pressure must be applied to the barrel 16. With the middle finger and thumb hold of the present invention, application of increased grip pressure does not cause any instability as in the prior art applicators wherein rotational or lateral slip or play between the applicator barrel and the fingers results from grasping the applicator barrel. On the contrary, the finger and thumb hold construction of the present invention enhances stability in maneuvering and positioning the applicator 10 and ejection and placement of the tampon 12. Accordingly, the tampon applicator 10 of this invention reduces or eliminates any slip or play, thereby reducing muscle tension. Thus, a user of the applicator 10 is provided with added security, comfort and control.

In summary, a woman can securely and comfortably grasp, control and position a tampon applicator 10 in accordance with this invention and a tampon 12 housed therein as a result of the finger and thumb hold or grip formed by the angled shoulders 34 and flattened surfaces 30 of the rear portion 32 of the applicator 10. By placing the user's middle finger and thumb on the flattened surfaces 30 of the rear portion 32 of the barrel 16 and set against the angled shoulders 34 of the barrel 16, the user is able to easily maneuver, control and position a tampon within her vagina without any excess muscle tension or strain which may result, in part, from rotational or lateral instability and movement.

The foregoing specification and drawings are merely illustrative of the invention and are not intended to limit the invention to the disclosed embodiment. Variations and changes which are obvious to one skilled in the art are intended to be within the scope and nature of the invention which are defined in the appended claims.

The embodiments of an invention in which an exclusive property or privilege is claimed are defined as follows:

1. A tampon applicator comprising:

a tubular barrel adapted to house and carry a tampon therein and a slidable, tubular plunger telescopically engageable with said barrel and operable to push the innermost end of the tampon within the

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barrel out of the forward end of the barrel into a vagina;

said tubular barrel comprising:

(a) a cylindrical front portion adapted to house said tampon;

(b) a rearward portion adapted to partially house and engage said plunger, said rearward portion of said barrel comprising two diametrically opposed, substantially flattened surfaces; and

(c) a transitional section between said rearward portion and said front portion, said transitional section having a reduced diameter relative to said front portion of said barrel;

whereby said flattened surfaces and said transition section provide a finger and thumb hold enabling a user to comfortably eject and control the position of said tampon.

2. The applicator of claim 1 wherein said transitional section comprises two diametrically opposed, angled shoulder surfaces.

3. The applicator of claim 1 wherein said flattened surfaces comprises a plurality of spaced apart ribs.

4. The applicator of claim 1 further comprising means for guiding said plunger axially within said rearward portion of said barrel.

5. The applicator of claim 4 wherein said guide means comprises a plurality of protrusions on an inner tubular surface of said rearward portion of said barrel which are axially engageable with said outer tubular surface of said plunger.

6. The applicator of claim 1 wherein said rearward portion of said barrel has a generally rectangular cross section.

7. The applicator of claim 6 wherein said plunger has a generally rectangular cross section.

8. The applicator of claim 1 wherein said flattened surfaces of said barrel comprises an arcuate depression.

9. The applicator of claim 1 further comprising means for limiting the movement of said plunger through said rearward portion of said barrel.

10. The applicator of claim 9 wherein said limiting means comprises a first curled lip integral with the inner end of said plunger and engageable with said transition portion and a second curled lip integral with the outer end of said plunger and engageable with said rearward portion.

11. A tampon applicator comprising:

a tubular barrel adapted to house and carry a tampon therein and a slidable, tubular plunger telescopically engageable with said barrel and operable to push the innermost end of the tampon within the barrel out of the forward end of the barrel into a vagina;

said tubular barrel comprising:

(a) a cylindrical front portion adapted to house said tampon;

(b) a rearward portion adapted to partially house and engage said plunger, said rearward portion of said barrel comprising:

two diametrically opposed, substantially flattened surfaces with a plurality of spaced apart ribs, and

two diametrically opposed, angled shoulder surfaces;

whereby said flattened surfaces and said angled surfaces provide a finger and thumb hold enabling a user to comfortably eject and control the position of said tampon.

12. The applicator of claim 11 further comprising means for guiding said plunger axially within said rearward portion, said guide means comprising a plurality of protrusions on an inner tubular surface of said rearward portion of said barrel which are axially engageable with said outer tubular surface of said plunger.

13. The applicator of claim 11 wherein said flattened surfaces of said barrel comprises an arcuate depression.

14. The applicator of claim 11 further comprising means for limiting the movement of said plunger through said rearward portion, said limiting means comprising a first curled lip integral with the inner end of said plunger and engageable with said angled surfaces and a second curled lip integral with the outer end of said plunger and engageable with the outer end of said flattened surfaces of said rearward portion.

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(12) **United States Patent**
Linares et al.

(10) Patent No.: **US 6,264,626 B1**
(45) Date of Patent: **Jul. 24, 2001**

(54) **PAPERBOARD APPLICATORS HAVING IMPROVED GRIPPING FEATURES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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Primary Examiner—Dennis Ruhl

(57) **ABSTRACT**

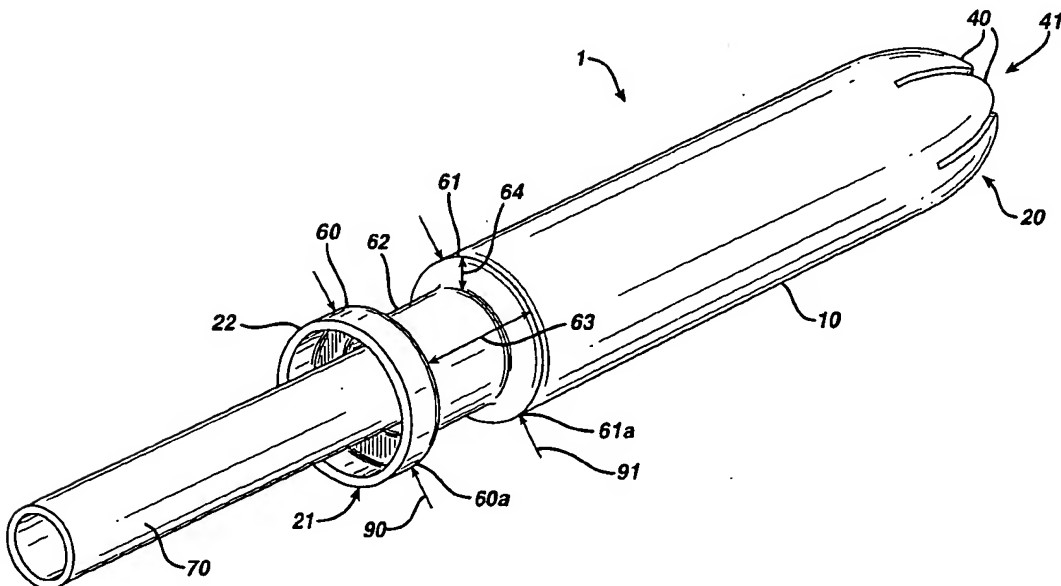
The present invention relates to applicators comprising an elongate insertion member having an insertion end and a gripper end opposite thereof, wherein the gripper end has an indentation with a shoulder on each end of the indentation. The shoulder most proximal the insertion end provides resistance to finger slip during the step of inserting the applicator into a body cavity. Whereas the shoulder most proximal the gripper end provides resistance to finger slip during the step of expelling material substantially contained by the applicator. The shoulder most proximal the gripper end also provides secure handling of the applicator while removing the applicator from the body after the expulsion step has been completed.

20 Claims, 2 Drawing Sheets

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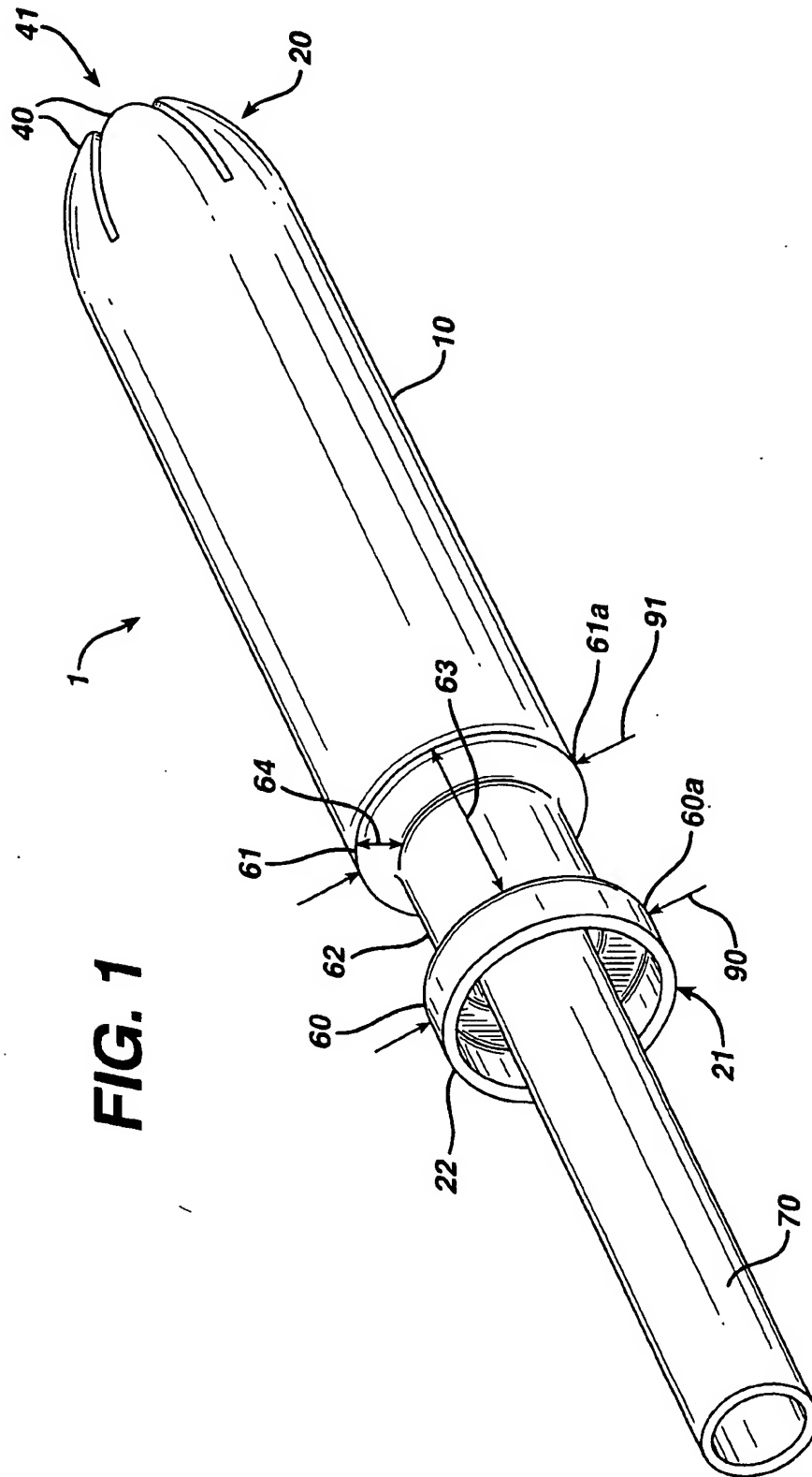
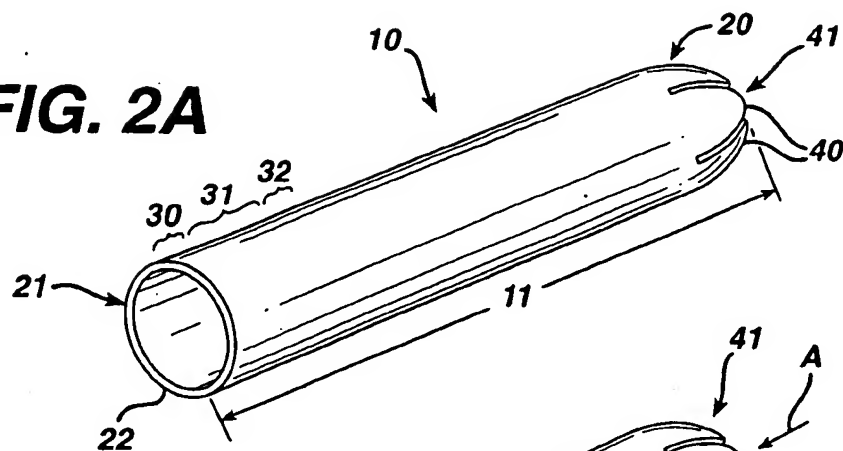
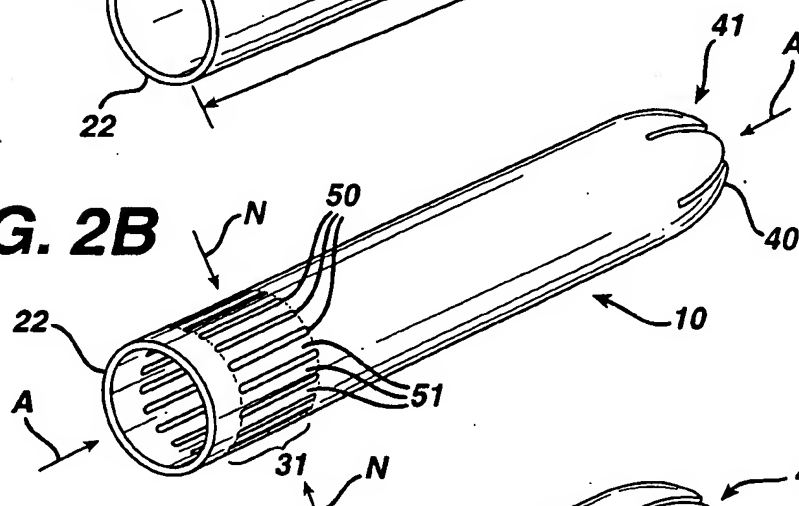
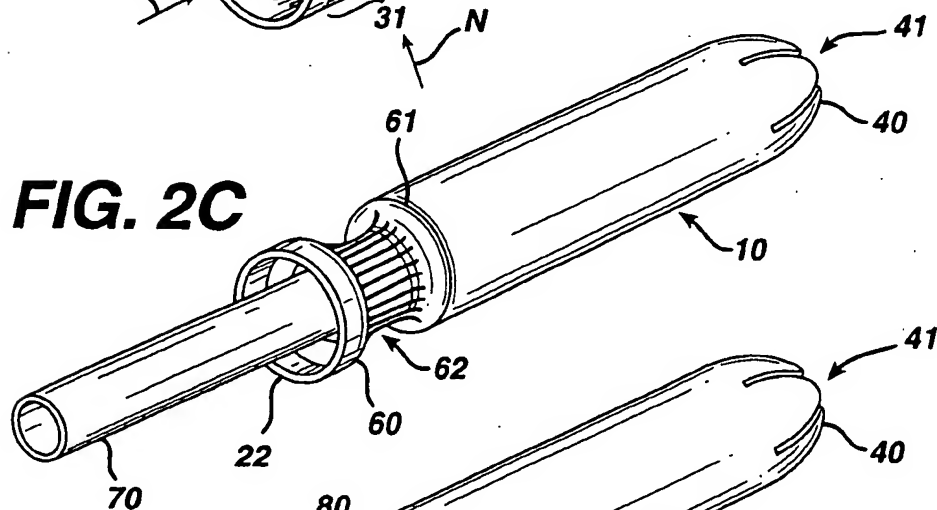
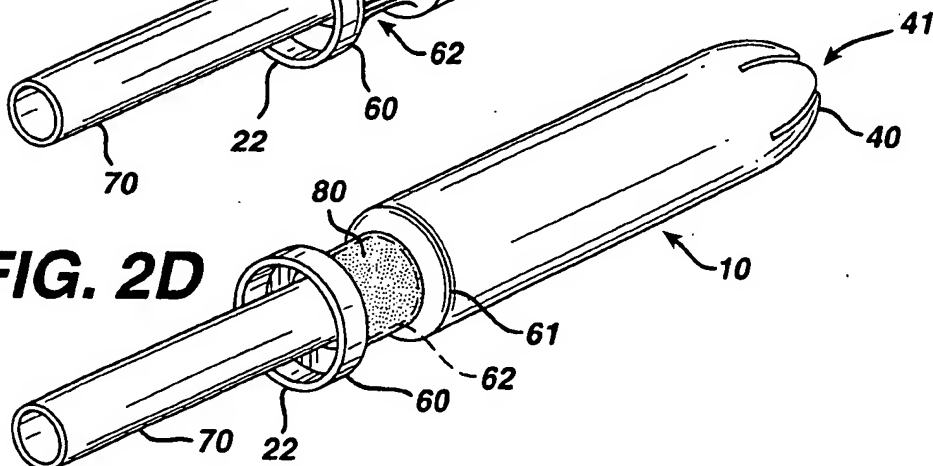


FIG. 1

FIG. 2A**FIG. 2B****FIG. 2C****FIG. 2D**

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PAPERBOARD APPLICATORS HAVING IMPROVED GRIPPING FEATURES

CROSS-REFERENCE TO RELATED APPLICATIONS

This invention is related to the following copending application: U.S. Ser. No. 09/340,312, filed Jun. 25, 1999, entitled "A Method of Making Applicators Having Improved Grip Features" (Att'y Docket, PPC-705).

FIELD OF THE INVENTION

The present invention relates to paperboard applicators for delivering materials into mammalian body cavities having an indentation in a finger grip region with shoulders on each end of the indentation. The applicator is particularly useful for delivering catemenial devices into a vaginal canal.

BACKGROUND OF THE INVENTION

Applicators for delivering materials into a body cavity typically comprise a tubular insertion member having an insertion end and a gripper end opposite thereof, and an elongate expulsion member slideably fitted within the tubular insertion member for expelling the contained materials. The gripper end will generally incorporate features to allow a user to more or less securely hold the applicator during use, which includes the following steps: inserting the applicator into a body cavity, expelling a substantially enclosed material contained by the applicator, and withdrawing the applicator from the body.

Over the years, attempts have been made to improve the gripping features. One approach is to significantly reduce the diameter of the applicator in the gripper end, as can be seen in the following U.S. Pat. Nos.: 4,508,531; 4,573,963; 4,755,164; and 4,573,964. For example, Whitehead (U.S. Pat. No. 4,508,531) discloses providing a blank with a plurality of slightly recessed areas outlined by scored lines, which result in a reduced diameter gripping portion when the blank is formed into a tubular structure. Whitehead discloses that the reduced diameter is for positioning and gripping a tube prior to insertion. While a reduced diameter grip may help in preventing fingers from slipping during insertion, there is little or no resistance offered in the opposite direction during the expulsion step. This is a step with which many users have difficulty.

Another approach to improve the grip of the applicator during use is to incorporate projections, such as in the form of a ring, at the base of the applicator member being inserted into the body. Examples of this approach are disclosed in Voss, U.S. Pat. No. 4,361,150, and Sartinoranont, U.S. Pat. No. 4,447,222. Similar to the disadvantage of applicators employing a reduced diameter in the gripper end, projections typically provide only a single direction of resistance. In most cases, the resistance provided is intended to aid during the expulsion step.

A number of attempts have been made to provide dual direction resistance to finger slip. Suzuki et al., U.S. Pat. No. 4,921,474, discloses a plastic applicator having a shoulder and an annular rib spaced therefrom in a region adjacent its rear end for gripping the applicator. The drawings in '474 depict the annular rib having a smaller height dimension than that of the shoulder, resulting in decreased resistance to finger slip during a step of expelling a tampon. Forces required to expel materials from an applicator can be as great, or greater, than the forces required to place the insertion member into a body cavity, thereby necessitating

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the need for as great of resistance for the fingers in directions away from the insertion end as that towards the insertion end. Additionally, it is relatively easy to employ gripping features in a plastic applicator due to the inherent formability of thermoplastic materials.

Most paperboard applicators have gripping features that provide limited resistance to finger slip during use. One example of this, Hagerty, U.S. Pat. No. 5,709,652, discloses an applicator having a plurality of finger-accepting apertures to provide relatively abrupt, finger-accepting edges to frictionally resist movement of a user's finger in response to longitudinal forces on the device. Although a useful contribution to the art, the finger-accepting edges of Hagerty are limited to the wall thickness of the tubular element. The width of the finger-accepting apertures is also limiting, in that only a portion of a user's finger will fit between the edges.

Another example, Tarr et al., U.S. Pat. No. 5,330,421, discloses a tampon applicator having relatively shallow indentations at the distal end. In addition to the indentations being shallow, they are depicted as being relatively narrow, resulting in the potential of bridging the indentation with a finger. If bridging occurs, then little or no resistance is offered by the indentations.

Thus, a need still exists for a paperboard applicator having gripping features that provide significant resistance to finger slip in two directions, as needed during insertion of the applicator into a body cavity and expulsion of materials substantially contained by the applicator.

SUMMARY OF THE INVENTION

The present invention relates to a paperboard applicator for delivering materials contained therein into a mammalian body cavity. The applicator includes an elongate paperboard insertion member having an insertion end and a gripper end opposite thereof. The gripper end has an indentation dimensioned to substantially accept a user's manual digit defined by a first shoulder substantially adjacent the gripper end and a second shoulder disposed toward the insertion end.

Such applicators are useful for the delivery of catemenial devices, such as tampons, intravaginal collection devices, and interlabial pads. The applicators are also useful for delivery of oral, rectal, and vaginal suppositories, as well as nasal devices, such as nasal tampons. Further, it can be used for delivery of various other materials including, medicaments, moisturizers, vitamins and minerals, spermicides, and odor controlling agents. These materials may be in the form of solids, creams, foams, gels, and the like.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a paperboard applicator provided by the present invention comprising an indentation in the gripper end, with two shoulders on each end of the indentation.

FIGS. 2A-2D depict steps (including optional steps) in a method of making the applicator of FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to paperboard applicators for delivering materials into body cavities, comprising elongate insertion members that are intended to be at least partially inserted into a body cavity. The elongate insertion members have an insertion end and gripper end opposite

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thereof. To improve a user's ability to securely hold the applicator during use, the gripper end of the insertion member employs an indentation with shoulders on each end of the indentation.

Referring now to the drawings, wherein like reference numerals designate like elements, FIG. 1 depicts an applicator 1, comprising a tubular insertion member 10, having a length 11 (shown in FIG. 2) that runs from an insertion end 20 to a gripper end 21. The insertion end may have a plurality of inwardly curved petals 40 that form a substantially closed dome 41. The gripper end 21 comprises an indentation 62 having a length 63, a depth 64, a first shoulder 60 and a second shoulder 61 located on either end of the indentation 62.

It is important for the length 63 to be of sufficient dimension to substantially accept a user's manual digit (width) within the confines of both of the shoulders 60 and 61. If a user's manual digit does not substantially fit within the indentation, then excess bridging of one or more of the shoulders may occur, substantially compromising the benefits provided by the indentation and shoulders, as described in detail below. As used in the specification and claims, the term "manual digit" means any of the digits extending from a hand, e.g. a thumb or finger. Length 63 is preferably at least 10 millimeters, more preferably from about 10 to about 25 millimeters, and most preferably from about 15 to about 20 millimeters. The depth 64 of the indentation is preferably from about 0.5 to about 3.5 millimeters and more preferably from about 1 to about 2.5 millimeters.

The indentation length 63 and depth 64 both provide for secure handling of the tubular insertion member 10. It is preferable to employ an indentation 62 having a length 63 of at least 10 millimeters and a length:depth ratio from about 4:1 to about 25:1.

When a user inserts the tubular insertion member 10 into a body cavity, her fingers and/or thumb are urged towards the insertion end 20 due to the frictional forces between the insertion member 10 and the walls of the body cavity. Shoulder 61 provides resistance to this movement, thereby providing a secure hold. Once the tubular insertion member 10 is successfully inserted into the body, a user can then expel material contained by the applicator. This is typically performed by displacing an elongate expulsion member, shown as element 70, into the tubular insertion member 10. During the expulsion step, her fingers and/or thumb are urged towards the gripper edge 22 due to the potential combination of many factors, such as the frictional forces between insertable material (not shown) and the inner wall of the tubular insertion member 10, and the forces required to open the substantially closed dome 41. Shoulder 60 provides resistance to this particular movement. The indentation 62 itself also provides improved handling of the applicator, because its reduced diameter increases the percentage of surface area contacted by a user's manual digits.

Preferably, the indentation 62 has a perimeter that is from about 60 to about 90% of a first perimeter 90 and a second perimeter 91 defined by the two shoulders 60 and 61, and more preferably from about 70 to about 80%. The first and second perimeters 90 and 91 are measured from apex points 60a and 61a, which are terminal shoulder points most distal the indentation 62. Preferably, the first and second perimeters 90 and 91 are dimensionally equal. However, they may also be different. Further to the benefit of relative difference in perimeter between the indentation 62 and the two shoulders 60 and 61, is the degree of transition from apex points 60a and 61a to the indentation 62. The resistance provided

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by the shoulders 60 and 61 increases as their effective radius decreases (i.e. as the transition approaches 90°). As used herein in the specification and claims, the term "perimeter" relates to the measurement about the structure as measured in and defined by a plane perpendicular to the longitudinal axis of the blank or the insertion member. This measurement may be on the inside or the outside of the structure. The perimeter of a substantially tubular structure is related to its diameter.

The applicator of the present invention can be made by manipulating a pre-made insertion member through a series of steps as can be seen in FIGS. 2A-2D. FIG. 2A depicts a pre-made tubular insertion member 10, having a length 11, an insertion end 20, a gripper end 21 opposite thereof, and optionally a plurality of inwardly curved petals 40 to form a substantially closed dome 41. The gripper end 21 comprises a gripper edge 22 and three adjacent regions: first region 30, second region 31, and third region 32. The second region 31 should be of sufficient length to substantially accept an ordinary person's finger or thumb. First region 30 and third region 32 are preferably much shorter in length compared to the second region 31.

A plurality of discrete sections 50 are removed from the second region 31, while maintaining non-removed sections 51, as shown in FIG. 2B. A representative, non-limiting list of methods useful for removing the sections 50 is the following: die-cutting, laser cutting, water jet cutting, thermoforming, grinding, and the like. The removed sections 50 have a major axis and a minor axis, with the major axis preferably oriented substantially parallel to the length 11 of the tubular insertion member 10. Alternatively, the major axis may be oriented at an acute angle to the length 11 of the tubular insertion member 10. The removed sections 50 have a length dimension that is parallel to the major axis from about 40 to about 90 millimeters, and a length dimension that is parallel to the minor axis from about 0.2 to about 1.5 millimeters. The length dimensions may be constant or varying along the periphery of the removed sections 50.

Referring to FIG. 2C, after removing the discrete sections 50, the second region 31 is collapsed to a diameter less than the diameter of the first region 30 and the third region 32. By collapsing the second region 31, an indentation 62 defined by shoulders 60 and 61 at the interface of the second region 31 and each of the first region 30 and third region 32, respectively. These shoulders 60 and 61 collectively provide resistance to finger/thumb slip in two directions. Applying a normal force N to the second region 31, or applying a combined axial force A to the tubular insertion member 10 and a normal force N to the second region 31 can collapse the second region 31, as shown in FIG. 2B.

The collective amount of material removed in the second region will generally dictate the difference in diameter between the collapsed second region and the first and third regions. Preferably, the diameter of the collapsed second region is from about 60% to about 90% of the diameter of the first and third regions.

As shown in FIG. 2D, optional materials may be added to the finger gripping region for a variety of reasons. These materials may be added as an indicator for where a user should grasp the applicator, as an indicator for differentiating products such as different absorbency tampons, and the like. Additionally, materials may be added within the indentation to further increase resistance to finger slip through increased friction, or to maintain the indentation once it is formed, thereby minimizing the tendency for the indentation

to "spring back." Preferred materials are elastomers 80, such as rubber; other polymeric materials, such as those that are shrinkable upon exposure to sufficient energy; and pigments or dyes.

While FIGS. 2A-2D depict making an applicator comprising an indentation starting from a pre-made tubular structure, similar methods can be utilized by starting with a sheet of material, wherein sections are removed in the sheet and then forming the sheet around a mandrel into the shape of a tube. The indentation may be post-formed after the tubular structure is made, or formed simultaneously with the forming of the tubular structure by utilizing a mandrel having a corresponding indentation.

Alternative methods for making applicators of the present invention include the following: papier-mache techniques and other paper laminating techniques, folding paperboard members to form pleats in the gripper region with or without the use of added plasticizers, and the like. More generally, there are a number of processes for making tubular paperboard applicators known in the art, as described herein below.

Paperboard applicators can be constructed from a single layer of paperboard material, or from a plurality of laminated layers to provide multiple benefits relating to the various layers. Useful paperboard stock for the formation of the tubular insertion members and expulsion members include, without limitation, cardboard, paperboard, cup stock, paper, laminated wood chips, and the like. The applicators can be made by the following non-limiting processes: spiral winding as disclosed in U.S. Pat. No. 5,346,468, convolute winding as disclosed in U.S. Pat. No. 4,508,531, and forming a sheet around a mandrel and then sealing an overlapped seam as disclosed in U.S. Pat. No. 4,755,164.

The paperboard applicators may include a surface layer, which may be useful to increase the comfort and ease of insertion and withdrawal of the applicator. The surface layer may be in the form of laminated films, coatings, and the like. An example of such a surface layer is disclosed in Blanchard, co-pending application U.S. Ser. No. 09/105,787 filed on Jun. 26, 1998. A representative, non-limiting list of useful materials to be used as the surface layer includes, waxes, cellophane, polyolefins, polyesters, epoxies, and the like. The surface layers may also include thermal stabilizers, pigments, fragrances, surfactants, antimicrobial agents, medicaments, and the like. There are many techniques known for applying the surface layers. A representative, non-limiting list of such techniques includes spraying, extruding, slot-coating, brushing, transfer coating, and the like. Additional processing steps may be required to cure the surface treatments to a useable form other than simple air curing, such as applying irradiation or other forms of energy.

Typical dimensions for each of the tubular insertion and expulsion members include a length of from about 50 to about 100 millimeters, a diameter of from about 8 to about 16 millimeters, and a thickness of from about 0.4 to about 0.6 millimeters. Preferably, the diameter of the expulsion member is less than the diameter of the tubular insertion member to allow for a telescopic arrangement of the two.

The tubular insertion member of the applicator provided by the present invention is preferably substantially closed prior to expulsion of the materials contained therein. Alternatively, the insertion end of the applicator can be more or less open, that is the diameter along the length of the tubular insertion member is substantially equivalent to the diameter of the insertion end. Procter & Gamble, of

Cincinnati, Ohio, currently offers for sale an open-ended tampon applicator under the trade name TAMPAX flushable applicator tampons. One technique for substantially closing the insertion end of the applicator is by employing a plurality of inwardly curved petals. The petals will flex and/or hinge to an open position upon expelling materials contained by the applicator. The number of petals generally ranges from about 4 to about 6. An alternative technique for substantially closing the insertion end of an applicator is by pleating the insertion end. This technique is disclosed in U.S. Pat. No. 5,782,793. When an applicator is constructed with more than one layer of material, a single layer may extend into the insertion end in an effort to reduce the force required to expel the contained materials. An example of this is disclosed in U.S. Pat. No. 5,827,214. These collective closures may be of spherical shape, or alternatively tapered shape.

The applicator of the present invention can be used for the delivery of catemerial devices, such as tampons, intravaginal collection devices, and interlabial pads. The applicator may also be useful for delivery of oral, rectal, and vaginal suppositories, as well as nasal devices, such as nasal tampons. Further, the applicator can be used for delivery of various other materials including, medicaments, moisturizers, vitamins and minerals, spermicides, and odor controlling agents. These materials may be in the form of solids, creams, foams, gels, and the like.

The disclosures of all U.S. patents and patent applications, as well as any corresponding published foreign patent applications, mentioned throughout this patent application are hereby incorporated by reference herein.

The specification and embodiments above are presented to aid in the complete and non-limiting understanding of the invention disclosed herein. Since many variations and embodiments of the invention can be made without departing from its spirit and scope, the invention resides in the claims hereinafter appended.

What is claimed is:

1. A paperboard applicator for delivering materials into a mammalian body cavity, comprising: an elongate paperboard insertion member having a length extending from an insertion end to a gripper end opposite thereof, the gripper end comprising an indentation dimensioned to substantially accept a user's manual digit, said indentation comprising a first shoulder substantially adjacent the gripper end and a second shoulder disposed toward the insertion end, wherein the indentation has a perimeter that is less than the perimeter of the insertion member adjacent at least one of the first and second shoulders.

2. The applicator of claim 1 wherein the indentation has a minimum outside perimeter and the insertion member has first and second outside perimeters at the first and second shoulders, respectively, and wherein the minimum perimeter of the indentation is about 60% to about 90% of the second perimeter, the respective perimeters defined by a plane perpendicular to the length of the insertion member.

3. The applicator of claim 2 wherein the first and second perimeters are substantially dimensionally equal.

4. The applicator of claim 1 wherein the insertion member is substantially tubular.

5. The applicator of claim 4 wherein the indentation has a minimum diameter and the insertion member has first and second diameters at the first and second shoulders, respectively, and wherein the minimum diameter of the indentation is about 60% to about 90% of the second diameter.

6. The applicator of claim 5 wherein the first and second diameters are substantially equal.

7. The applicator of claim 5 wherein the indentation has a substantially constant diameter between the shoulders.

8. The applicator of claim 1 wherein the indentation has a length from about 10 to about 25 millimeters.

9. The applicator of claim 1 wherein a layer of shrinkable polymeric material resides within at least a portion of the indentation.

10. The applicator of claim 1 wherein a layer of elastomeric material resides within at least a portion of the indentation.

11. The applicator of claim 1 wherein the insertion end is substantially closed.

12. The applicator of claim 1 wherein the insertion member has an outer layer comprising polymeric material.

13. The applicator of claim 12 wherein the polymeric material is epoxy.

14. The applicator of claim 1 further comprising an elongate expulsion member which is slideably within the elongate insertion member.

15. A paperboard applicator for delivering materials into a mammalian body cavity, comprising: a paperboard tubular insertion member comprising an insertion end and a gripper end opposite thereof, the gripper end comprising an indentation, said indentation comprising a first shoulder substantially adjacent the gripper end and a second shoulder disposed toward the insertion end, the indentation having a perimeter that is less than the perimeter of the insertion member adjacent at least one of the first and second shoulders

and a length sufficient to substantially accept a user's manual digit such that excess bridging by the user's digit across the indentation does not occur.

16. The applicator of claim 15 wherein the indentation has a minimum diameter and the insertion member has first and second diameters at the first and second shoulders, respectively, and wherein the minimum diameter of the indentation is about 60% to about 90% of the second diameter.

17. The applicator of claim 16 wherein the first and second diameters are substantially equal.

18. The applicator of claim 15 wherein the indentation has a length from about 10 to about 25 millimeters.

19. A paperboard applicator for delivering materials into a mammalian body cavity, comprising: an elongate insertion member comprising an insertion end and a gripper end opposite thereof, the gripper end comprising an indentation, said indentation comprising a first shoulder substantially adjacent the gripper end and a second shoulder disposed toward the insertion end, wherein the indentation has a perimeter that is less than the perimeter of the insertion member adjacent at least one of the first and second shoulders, a length of at least 10 millimeters and a length to depth ratio of from about 4 to about 25.

20. The applicator of claim 19 wherein indentation has a depth from about 1 to about 2.5 millimeters.

* * * * *

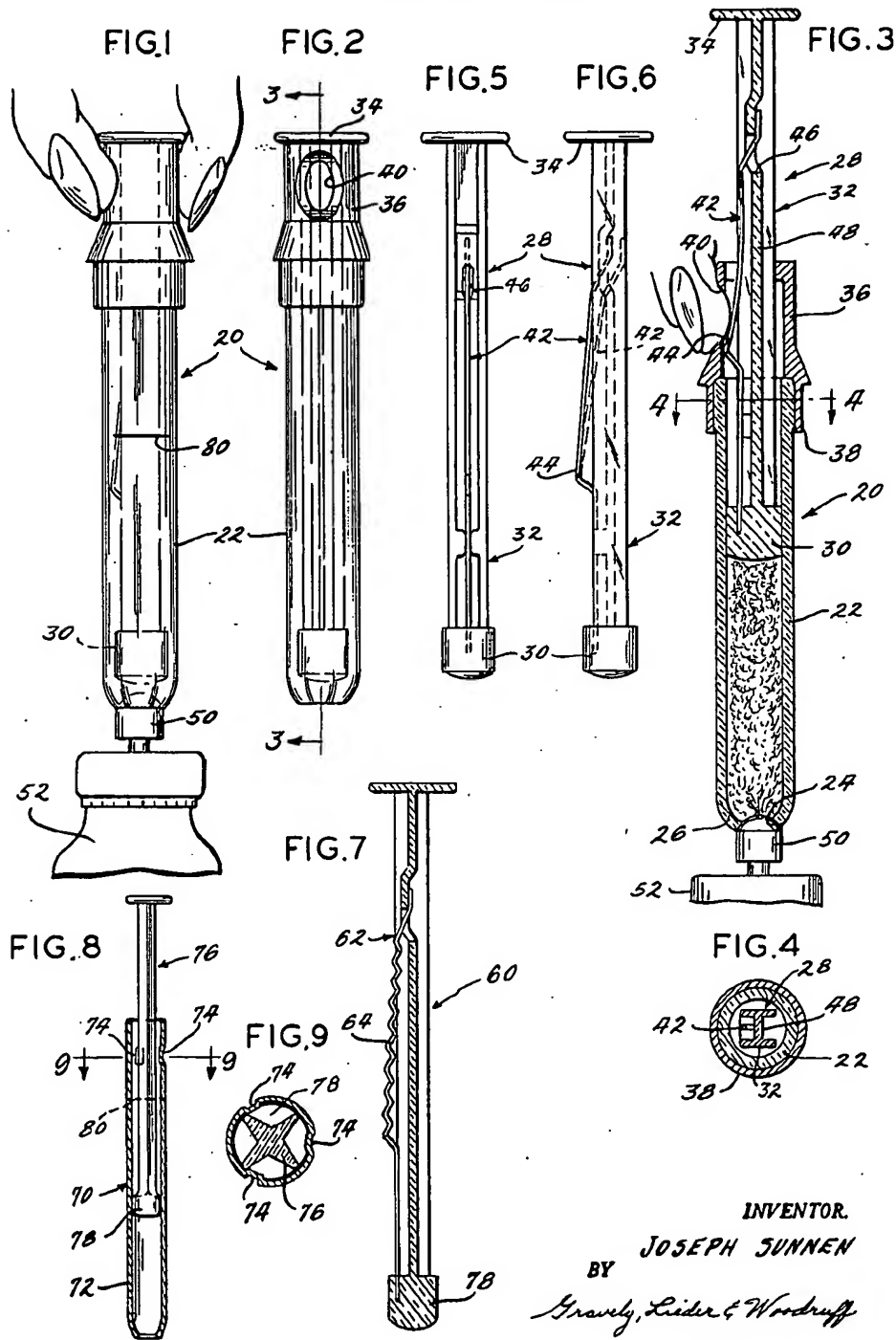
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3,220,413

APPLICATOR

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5 Claims. (Cl. 128-261)

The present invention relates generally to applicators and to methods of application and more particularly to applicators for applying medicinal and chemical substances and to the method employed for applying said substances.

Many devices and methods of applying medicinal and chemical substances have been devised and used in the past, and many of the known devices and methods have been used in the application of such substances in human body cavities. For the most part, however, known devices and methods have been used in the application of substances in liquid, cream, jelly, and pill form, and none so far as known has suggested or employed means for applying such substances through the medium of a stable foam carrier. Furthermore, the known means and method have had certain disadvantages and shortcomings such as providing incomplete and non-uniform coverage of the area being treated or coated. They have also been relatively more difficult and inconvenient to use and in some cases have required considerable time to complete an application and to cover the desired area. In some cases the form in which the substance is applied has also made it difficult to maintain the substance in the desired area for the time required for treatment. These and other disadvantages and shortcomings of known means and methods are overcome by the present invention which teaches the use of novel applicator means and a novel method of applying medicinal or chemical substances in a manner to uniformly cover and remain in contact with a desired area. To this end the subject means and method employ a stable foam carrier for the substance being applied.

It is therefore a principal object of the present invention to provide improved applicator means and method of applying medicinal and chemical substances which are particularly well suited to the application of such substances in body cavities.

Another object is to use a stable foam carrier for the application of medicinal and chemical substances.

Another object is to provide relatively inexpensive and easy to use means for applying medicinal and chemical substances.

Another object is to provide an applicator device which includes means sensitive to touch or feel as well as sight to indicate when it is filled to a predetermined level.

Another object is to provide applicator means that are relatively easily disassembled and cleaned.

Another object is to provide relatively small lightweight applicator means.

Another object is to provide applicator means particularly well suited for applying substances dispensed in foam form from aerosol containers.

Yet another object is to provide applicator means that are particularly well suited to the application of substances into body cavities such as into female vaginas.

Briefly, the present invention comprises an applicator device having a tubular body portion open at one end, and a plunger member slidably positioned in said body, said plunger having an operator portion extending outwardly from said body opposite the open end for moving the plunger member back and forth in the body. In one form of the device an opening is also provided in the side of the body and means carried on the plunger member cooperate with the said side opening to indicate by touch sensitivity a predetermined plunger position. The

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invention is particularly well suited to use with aerosol dispensed substances in a foam or foam-like form, and the invention also resides in the method of using the subject applicator device.

These and other objects and advantages of the present invention will become apparent after considering the following detailed description of several embodiments of the invention in conjunction with the accompanying drawing, wherein:

FIG. 1 is a side elevational view of an applicator constructed according to the present invention and shown in cooperative engagement with an outlet valve on an aerosol-type container;

FIG. 2 is a side elevational view of the applicator per se as seen from the left in FIG. 1;

FIG. 3 is a cross-sectional view taken on line 3-3 of FIG. 2, showing the applicator in a substantially extended or filled condition;

FIG. 4 is a cross-sectional view taken on line 4-4 of FIG. 3;

FIG. 5 is a front view of the plunger portion of the applicator of FIGS. 1-3;

FIG. 6 is a right side view of the plunger of FIG. 5;

FIG. 7 is a side view similar to FIG. 6 showing a modified form of plunger member;

FIG. 8 is a side elevational view similar to FIG. 1 showing a modified applicator construction; and

FIG. 9 is a cross-sectional view taken on line 9-9 of FIG. 8.

Referring to the drawings by reference numbers, the number 20 refers to an applicator for applying or dispensing medicinal or chemical substances, and is particularly well suited to the application of such substances into a body cavity.

In FIGS. 1-3 the applicator 20 is shown in assembled condition and comprises a tubular member 22 having an internal capacity or expandable chamber capable of holding a predetermined amount of a substance to be applied, said substance to be applied while in a stable foam or foam-like carrier. One end of the member 22 has an opening 24 therethrough of desired size and shape as defined by an annular flange 26.

A plunger member 28 is slidably positioned in the tubular member 22 as shown in FIG. 3 and its movement in the member 22 forms an expandable chamber for receiving the substance to be applied. The plunger 28 has a piston portion 30 on the end which slidably contacts the inner surface of the tubular member 22, and a rod portion 32 is connected to the piston portion 30. The rod portion 32 extends outwardly from the end of the tubular member 22 opposite the opening 24 and has a button 34 on the end thereof. In the form of the applicator shown in FIGS. 1-4, the rod portion 32 has an H-shaped cross-section, see FIG. 4, although other shapes could also be used.

The end of the tubular member 22 through which the rod 32 extends is provided with a closure member 36 which is slidably and sealably fitted thereon by an integral annular flange 38. The closure member 36 also has an H-shaped opening that slidably receives the rod 32.

One side of the closure member 36 has an opening 40 therethrough, and the associated side of the rod 32 carries a spring member 42 which has a cam portion 44 that cooperates with the opening 40 as shown in FIG. 3. The purpose of the opening 40 and spring 42 is to provide means, sensitive to touch, for indicating to the user a particular position of the plunger 28 in the member 22, and thereby to indicate a predetermined fullness of the applicator 20. The lower end of the spring 42 is attached to the piston portion 30 of the plunger 28, and the upper end is formed to extend through an opening 46 in the

central portion 48 of the plunger rod 32. The upper end of the spring 42 is therefore allowed limited movement relative to the plunger 28 as shown in dotted outline in FIG 6, and the spring is tensioned to normally be in the outwardly extended position on the rod 32. This enables the spring 42 to have limited movement on the central portion 48 of the rod 32.

The applicator 20 is assembled in the condition shown in FIGS. 1-3 and is filled by being held between the thumb and forefinger and pressed against a normally closed valve member 50 on an aerosol type container 52. When sufficient pressure is applied to open the valve 50, the contents of the container 52, which includes a liquid substance and a propellant will be emitted through the valve 50 and through the opening 24 into the expandible chamber in the tubular member 22 in a foam or foam-like condition. As the foam product is emitted from the container 52 and enters the tubular member 22 it operates against the piston 30 and moves the piston upwardly. In so doing, the plunger 28 also rises and the cam portion 44 of the spring 42 moves past the opening 40 and engages the finger (or thumb). This indicates to the user that the applicator is filled to the desired level. The applicator 20 is then removed from the valve 50 and is ready for use. The shape of the applicator makes it particularly well suited for applying substances into body cavities, such as into a vagina. The application consists of simply inserting the member into the cavity to the desired depth and then pressing on the button 34 to expel the contents thereof through the opening 24. Since the contents are preferably in a foam condition they will cover a relatively large area of the body cavity and will provide a relatively uniform coating for the entire area of the cavity.

A modified form of plunger member 60 is shown in FIG. 7. The principal difference between the modified plunger 60 and the plunger 28 is that the modified plunger spring member 62 has a wavy cam portion 64 which cooperates with the thumb or finger opening 40. This waviness is more sensitive to touch and therefore provides a more easily recognizable indication of when the applicator is filled to the desired level.

After the applicator 20 has been used it is easily disassembled for cleaning by sliding the closure member 36, which is preferably constructed of relatively soft plastic or rubber material, off the end of the tubular member 22, and removing the piston 28. The parts are then washed, rinsed and reassembled for later use.

In FIGS. 8 and 9 there is shown a modified form of applicator 70. The modified applicator 70 is of two piece construction and has a tubular member 72 constructed similarly to the tubular member 22 except that it is not provided with a closure member such as the member 36. Instead, the tubular member 72 is provided with one or more slight indentations 74 adjacent the upper open end thereof. A plunger member 76 having a piston portion 78 makes sliding engagement with the inner surface of the tubular member 72. The piston portion 78, however, will not easily slide past the indentations 74 but can be forced past for removal and cleaning purposes. In this construction as in the other constructions, the members are preferably formed of relatively inexpensive plastic material, and the indentations 74 normally hold the members in assembled condition. Also the modified applicator 70, as well as the applicator 20 can be formed of a clear, transparent plastic and a line 80 can be applied to the surface to provide visual means for indicating the desired level of filling of the applicator.

The present applicator and method of applying substances has been found to be particularly suitable in the application of substances into relatively deep body cavities such as into female vaginas and the like. The application of substances into such areas when applied through the medium of a stable foam carrier provides a non-messy, efficient and uniform way of relatively evenly

covering or coating the surfaces of such cavities, and also provides a more convenient comfortable way of performing the application. Obviously, many different substances can be applied using the subject applicator and method and it is therefore not intended to limit the invention to a particular type of application or a particular substance.

Thus, there has been shown and described novel applicator means and a novel method for applying medicinal, chemical and other substances which fulfills all of the objects and advantages sought therefor. Many changes, modifications, and alterations of the subject means and method and many different uses and substances therefor will become apparent to those skilled in the art after considering this specification and the accompanying drawing. All such changes, modifications and variations and other uses and substances therefor which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

What is claimed is:

1. Applicator means for applying medicinal substances comprising a tubular member having an opening at one end defined by an inwardly extending annular flange, a piston and rod assembly slidably positioned in the tubular member, means on the tubular member engageable with the piston and rod assembly to prevent rotation of the piston therein, a finger or thumb opening in the side of the tubular member adjacent the end thereof opposite from the aforesaid open end, and means carried by said piston and rod assembly in alignment with said side opening for engaging a finger or thumb positioned against the side opening to indicate by feel sensitivity a particular position of said assembly in the tubular member.

2. Applicator means for applying an aerosol dispensed substance in stable foam condition comprising a tubular body having an opening at one end defined by an inwardly extending flange, said flange being of a size to cooperate with an outlet valve on an aerosol container of a type for dispensing a substance in a foam carrier, a piston and rod assembly slidable in said tubular body and movable from an empty position adjacent to the open end of the tubular body to a full position spaced from the open end when pressed against and opening the valve on an aerosol container, a thumb or finger opening in the side of the body adjacent the opposite end thereof from the open end, and means on the piston and rod assembly adapted to cooperate with said side opening to indicate by feel sensitivity a particular position of the assembly in the body.

3. The applicator means defined in claim 2 wherein said means carried by the piston and rod assembly includes a spring member extending outwardly from the piston and rod assembly along the side thereof associated with the side opening in the tubular member.

4. The applicator means defined in claim 3 wherein said spring member has a cam portion which moves past the side opening during movement of the piston and rod assembly in the body.

5. The applicator means defined in claim 3 wherein said spring member has a cam portion defined in part by a wavy portion which moves past the side opening during movement of the piston and rod assembly in the body.

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